

*URGENT FILE*

JPRS: 3997

28 September 1960

SELECTED SOVIET MILITARY TRANSLATIONS

NO. 31

(Materials on the Soviet Air Force)

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JPRS: 3997

CSO: 2800-D/31

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(MATERIALS ON THE SOVIET AIR FORCE)

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## I. THE AIRFIELD: CENTER OF FLIGHT TRAINING WORK

25 June 1960

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Editorial

The warm dry weather lent a certain character to the combat training of the flying personnel of all the branches of aviation. The aviators spend a considerable part of their duty time at the airfield; these are the centers for flight work.

It is very natural that the successes in raising the quality of the combat training and in perfecting the professional skill of the fliers depends to a considerable degree on the equipment of the airfield and on the existence of a well-organized and orderly system at them.

In leading units, the commanders, staffs, political organs and Party and Komsomol organizations have been concerned in advance about the creation of favorable conditions leading to fruitful flight training. This, in particular, was the case at the N aviation post where Officer Kofanov is serving. Here they not only put the take-off and landing strip, the taxiways and the parking positions for the planes in good condition, but they also equipped an outside classroom and set up special tents where the crews which were not flying could rest.

All this has a positive effect on the use of the time before take-off. When the crews go to the building and the aviation specialists are finished servicing the equipment, they are able to study the manuals and instructions right there at the airfield; also they can study the most complex problems involved in using the combat machines. The flying personnel do not waste a single minute. It is no accident that many aviators in this unit were able in the initial days of their flight period of training to make substantial progress in raising their combat skill.

At the permanent airfields which are used for flying throughout the whole year, the training equipment, as a rule, is in satisfactory condition. It needs only to be improved or restored. Inasmuch as flights are conducted from temporary airfields during the summer, special attention should be devoted to equipping them and to maintaining them in constant readiness.

It must not be permitted that the poor preparation of dirt take-off and landing strips or taxiways would lead to the development of conditions which might result in various types of flying accidents. We can and must equip these temporary fields, without expending large resources, with improvised classrooms and storage and supply rooms for the most needed parts as well as places where the flying personnel can rest. For this purpose it is necessary that the commanders of the aviation maintenance units and the officers of the airfield support service manifest initiative and

competence in their work while demonstrating a high sense of responsibility for what they are doing.

Why, for example, are there classrooms, training apparatus and visual aids at the summer airfield of one of the aviation schools? It is because the officers, especially Comrade Tutushkin, exerted themselves considerably in using their local resources for equipping the training site.

At the airfield of the N fighter unit until recently there were no wind deflection devices for use at the field. The take-off and landing strip here often was not maintained in the proper fashion. Because there was a lack of continuous supervision of the condition of the strip, there existed conditions which could have resulted in accidents. On one of the flying days several planes had defective landing gears. When they began to look for the reasons for the defects, it turned out that the landing gear housing became packed with dirt which was picked up during take-off and, therefore, when it came time to land, the gear did not work properly. Who was to blame for this? First of all, Officer Borodin was; he was responsible for the daily maintenance of the facilities of the airfield.

It is an important duty of the aviation commanders at all levels to see that the airfields are kept in constant readiness for flights. It is no less important, however, to see that they are maintained in model order and that the training is conducted efficiently and that the activities of all flying personnel are highly organized.

The flight director has an important role in organizing an efficient routine at the airfield. It is on him as the overall commander that the exact and skilled performance of the training plan depends. The strictness and efficiency of the flight director have a positive effect in perfecting the combat skills of the aviators and in making each day or night of flying effective. While performing his important duties, he must exert every effort to see that everything is done properly at the airfield and that each person performs his duties diligently.

The summer is the time of greatest activity in flight training. Various things cause difficulties in controlling the flights. The airfields are equipped with many technical means; the airplanes are continuously taxiing to the starting point or to parking positions; there is much movement of special machines and people.

In these days when our fliers are busy with their intensive flight training, the Party-political work must be carried on continuously and purposefully. It is the task of the political organs and the Party and Komsomol organizations each day to render real help to the commanders in training the personnel and in mobilizing them to still greater accomplishments in their combat and political training and in strengthening their military discipline.

## II. ACADEMY'S PARTY COMMITTEE AND MILITARY SCIENTIFIC WORK (PARTY COMMITTEE OF ENGINEERING ACADEMY)

25 June 1960  
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Lieutenant General of Aviation  
I. Semenov, Secretary of Party  
Committee, Air Force Engineering  
Academy imeni Zhukovskiy

The Party committee and the Party organization of the Air Force Academy imeni Professor N. Ye. Zhukovskiy are attempting to become actively involved in instruction and in scientific research work. This effort is helped to no little degree by the fact that there has been a substantial increase in the number of Party activists through an influx from the professors and teaching personnel. Thus, for example, about 80% of the secretaries of the local Party organizations are professors, doctors, docents and graduate students in science. Many scientific workers have been elected to membership in the Party committee and the Party bureaus of the faculties.

The Party committee and the primary Party organizations of the departments and courses of study continuously keep the planning and organization of scientific research and the practical use of their accomplishments in the center of their attention. The necessity for this is explained first by the fact that the academy with its large body of personnel specializing in aviation science can exert great influence on the future development of this science and, second, by the fact that scientific research enriches and improves the teaching process which is most important because of the role of the university in building cadres.

Basing their actions on the decisions of the Twenty First Party Congress and the June Plenum of the Central Committee of the CPSU (1960), the Party committee and the Party organizations have attached prime importance to the correct selection of scientific trends, i.e. to placing before the scientific collectives such tasks as will lead to further technical progress in a given field of science and to planning scientific work in the departments. It was for this reason that a group of activists, after the results of the June Plenum of the Central Committee had been discussed at a gathering, prepared, under the leadership of Professor Belotserkovskiy who is a member of the Party committee, and submitted questions to the plenum of the Party committee for its analysis on the arrangement of scientific research and on ties between scientific institutions, the Design Office, and the troops. The discussion of this question at the plenum of the Party committee while inviting the leading scientists of the academy and then the work in the primary Party organizations of the departments and laboratories made it possible to check and refine the most important trends in scientific research, to learn which of them have been

at a standstill for years without giving any scientific results, to help the arrangement of scientific forces, and to mobilize the communists and all the personnel of the academy in order to fulfill the plan.

The Party organizations, having a knowledge of what is being done, enter into the course of the scientific research and help in expressing criticism which contributes to the elimination of deficiencies and to the development of creative ideas.

In this respect, much is being done, for example, in the Party organization of the department headed by Professor Krasovskiy. The Party organization solidified the collective of the department on the basis of cooperative labor with the Party organization of an institution which was also participating in one phase of the scientific research.

This, however, was not always the situation. Some Party organizations failed to differentiate as to what was fruitless research or useless expenditures of manpower and materiel. This, for example, was the case in one of the departments of the academy when it was discovered that the work of one teacher, Engineer-Colonel Kononchuk, which had been in progress for 2 years, was not proceeding in the proper direction.

The Party committee received indications that something was the matter in one of our oldest departments. The Party committee instructed a group of comrades headed by an honored figure of science and technology, Professor Bolkhovitinov, to examine the work of the Party organization of this department in carrying out the decisions of the Twenty First Party Congress and the June Plenum of the Central Committee. The results of the check were discussed in the bureau of the Party committee together with the Party activists of the department. Serious shortcomings were uncovered in the activities of the department and the laboratories which served it; instances were noted of unpartylike relations between individual leaders. The Party organization did not fight against these shortcomings and was not concerned about uniting a collective. The bureau of the Party committee rendered assistance to the Party organization of the department.

Experience has shown that drawing a group of Party activists from among the professors and teachers in order to prepare problems on military scientific work for discussion by the plenum and bureau of the Party committee is fully justifiable. We also often come to their assistance. It is sufficient to say that more than 160 persons took part in the preparation of various questions during the period after the election of the Party committee.

The accomplishment of scientific research is only a part of the matter; it does happen, after all, that the results of the research are placed "on the shelf" and are not put to practical use. In order to avoid similar instances, the Party committee decided

to occupy itself with the problem of putting into practice the discoveries of Doctor of Technical Sciences M. L. Novikov who had developed the theoretical basis and created test models of a new gear-type transmission. His research opened new perspectives for our machine builders for creating machines and mechanisms with miniature gear-type transmissions and which make it possible to transmit forces which are considerably greater than is possible with evolution-type transmissions under equal conditions and with a large saving of energy lost because of friction. M. L. Novikov was awarded the Lenin Prize posthumously in 1959.

The discussion of this matter at a meeting of the Party committee of the academy showed that the Party organization of the department headed by Comrade Shtod demonstrated concern about putting this mechanism into practical use. Personnel in this department established close ties with many plants and with the Design Office, conducted consultations, and organized demonstrations of M. L. Novikov's device at the Exhibition of the Accomplishments of the Economy of the USSR. For this work Comrades Chesnokov and Fedyakin who were co-workers in the laboratory received gold medals of the VDNKh and the academy received the diploma of VDNKh. These and other measures on the part of the Party organization of the department produced a considerable expansion of the scale on which this invention was employed. About 400 organizations are now working on the discovery of M. L. Novikov.

The Party committee in its decision directed the attention of all the Party organizations of the academy to the positive example of the department headed by Comrade Shtod in connection with the effort to introduce the products of scientific research. Many shortcomings were uncovered, however, by the Party committee. Not all the departments of the academy became involved in the further development of the invention of M. L. Novikov. Taking into account the fact that at some enterprises the introduction of this discovery is being delayed, the Party committee also adopted a decision to approach some oblast Party committees and people's soviets with a request to help in advancing the use of this discovery in production.

The Party organizations and Party committee of the academy are laboring persistently to see that all the scientific research conducted by the departments are closely coordinated with the activities of units of the Armed Forces concerned with flying practices and with the use and servicing of aviation equipment. Recently the Party committee discussed measures to improve training instruction and scientific research work designed to provide for safe flying. Our academy must do much both in the field of educating and teaching officers and in the field of effecting further improvements in the technical servicing of equipment and in improving equipment. In discussing this question it was noted that not all the departments of the academy, even the special ones, have good ties with military

units and know the conditions under which aviation equipment is employed.

In the light of the new tasks which face the Armed Forces, the Party committee proposed to the Party organizations of teaching and scientific research divisions and of all special departments that they consider measures to strengthen ties with units and organize and conduct assignments for teachers in units, etc.

Students at the academy are brought into research on a broad basis. They work in scientific circles attached to the departments and then in the laboratories or, as in one of the departments, in a students design bureau. A large number of the best students carry on their study according to individual plans. This makes it possible for them to spend more time on scientific work. It is now a frequent occurrence that a degree project is performed with an experimental part, i.e. with a real machine, construction element, working plan, etc. Many students who began their scientific work in circles of the Military Scientific Society are candidates for entry into assistantships. The Party committee stated that it is in favor of establishing a military scientific society for the students. Practice has shown that the military scientific society for students to exist separately from the military scientific society for permanent personnel was more effective with respect to organizing and developing the military scientific work of the students. It was really an independent and active organization.

The headquarters and the Party committee and Party organizations of the academy, relying on a group of activists from the professor and teacher personnel, began to work with greater skill on scientific work and to devote more attention to the connection between theory and practice. This does not mean, however, that we have already done everything or that every opportunity has been employed to spread military scientific work. The Party committee and Party organizations of the academy must still exert much effort in order to raise this work to a new and higher level corresponding to modern requirements and the level of military equipment and weapons.

### III. IGNORED STANDARDS LEAD TO AN ACCIDENT (AIRCRAFT MAINTENANCE AND INSPECTION)

26 June 1960

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Major V. Valyuzhenich,  
pilot 1st Class

When flights are taking place, the director maintains a special journal. In it he notes the mistakes which the fliers make in the technique of piloting and any infractions of the rules of safety while flying. The notes in the journal make it possible for us unit commanders to discover in time the weak areas in the training of our subordinates and to take the necessary measures.

We have such a rule that after a mistake has been discovered, the reason for it is carefully analyzed and measures are taken to rectify the situation as quickly as possible. Let us examine a few cases.

During one of the flights, Senior Lieutenant Bushmakin found himself in a difficult situation. The mechanism which heats the cabin was not working for some reason. It is true, the crew did overcome the difficulty and fulfilled the flight mission. The fact, however, that a malfunction in the aviation equipment had developed was alarming. They began to search for the cause. And what was the result? The malfunction could have been discovered on the ground before the flight; however, Officer Bushmakin was careless with respect to his aviation equipment. Instead of examining the airplane carefully in order to be certain that everything was working properly, he blindly accepted the information from the crew which had flown the aircraft a short time before.

We did not limit ourselves to analyzing this incident. We organized training for all the personnel of the detachment during which we again studied the rules for pre-flight inspection. An engineer showed the pilots directly on the airplane in what sequence and which mechanisms should be checked with special care.

A thoughtful approach to the elimination of shortcomings helps us to work without flying accidents. In the unit we have both experienced and new fliers. We have to fly with them in turn. The load on the aircraft is very great. Various kinds of damage are possible. The equipment, therefore, is examined carefully after each flight. The pilots also take an active role in checking on the condition of the equipment. More careful inspections are conducted during maintenance periods.

It is true, that it was necessary for us to think about how to best use the time set aside for maintenance. The older commanders recommended that on maintenance days we conduct special inspections. An inspection plan was worked out. The engineers compiled a special list with instructions as to which units in the airplane were to be inspected on the next maintenance day.

It would sometimes happen that an aviator would make a mistake on the ground or in the air. Upon learning of this, some directors consider that there is no sense in alarming people because the fault occurred in another unit whereas everything was still in order in their own units. This is a dangerous misconception. Regardless of where the thing took place, the commander must consider whether or not he has done everything to avoid a similar accident in his own crew or flight. After all, shortcomings and mistakes can develop in places where they now do not exist.

Once there was such an incident. Aircraft were flying. Suddenly the weather became quite bad. A flier of an adjacent squadron, Capt. Yevenko, began to descend by instruments for a landing. Many of us believe in the strength and ability of the aviator. He will surely handle the situation; he is not a novice; he is a second class pilot. Many times he has had to make a landing using this system! This was the thought as to how it would be. We soon, however, were disappointed. Yevenko made his fourth turn with a delay and was not able to bring his plane exactly in line with the landing strip. He made another attempt and once again was unsuccessful. Only on his third attempt was he able to land the aircraft successfully.

What does this say about the possibility of a flying accident? Definitely it was there. We spoke of this in a loud voice as we analyzed the flight and in conversations. The reason for the difficulties of Capt. Yevenko became clear to everyone. He had lost his earlier acquired skills.

Captain Yevenko made a correct conclusion from that which had happened. With the help of his commander and other experienced pilots, he quickly eliminated the gaps in his training. His crew became one of the best in the unit. For our part, we examined the other fliers of the detachment. It developed that we also had some comrades who acted with indifference toward training, forgot some things, and had an insufficiently accurate understanding of the method of landing by instruments. Senior Lieutenant Makukha and Captain Artyemenko, for example, were in the same position as Captain Yevenko; however, in their case we discovered this fact before they had any difficulty.

The personnel of the detachment undertook through their common efforts to eliminate all shortcomings. Additional training was organized for all crews in the detachment. Experienced fliers as well as individuals such as Navigator Nozdrachev conducted a series of talks. They spoke of the basic rules for using the means of radio communications in flying and in landing under complex conditions. Main emphasis was placed on raising the quality of the training.

Did such training help? Very definitely it did. The fliers gradually eliminated their shortcomings and acquired firm skills

in piloting aircraft. This was true of both Captain Artemenko and Senior Lieutenant Makukha. They made noticeable progress in raising their flying skill.

It is easier to fight against those factors which lead to accidents if we know the mistakes which an aviator can make in the air. This is why we desire that the flying personnel inform their commanders truthfully of any unforeseen or complex situations which arise during flight because of errors in flying technique or in handling the apparatus. Those aviators who try to shift the blame for their own slips to other people are judged very severely.

The crew of an airplane in which Senior Lieutenant Semenov was navigator once failed to perform their mission and landed with their bombs. Semenov spoke of trouble with the radar sight. The efforts of aviation specialists failed, however, to uncover any malfunction in the instrument. Actually, there was none. The sight worked very well. The navigator had made a mistake in using the apparatus. Semenov became convinced of this when his performance was analyzed at a post-flight discussion.

In fighting against the conditions which could result in accidents, I, as commander of the detachment, receive much help from the Party and Komsomol organizations. The communists and Komsomol members give an example of the combat training and instruction of aviators. The slightest infraction of an established procedure becomes a subject for a serious conversation in the Party and Komsomol collectives. Thus the personnel of our unit struggle in a common effort against shortcomings and they increase the combat readiness of each crew.

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#### IV. BOMBERS OVER THE RANGE (BOMBING RANGE FLIGHT CONTROLLERS)

28 June 1960

Col. R. Doblatov

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The crew of the airplane, while performing a night mission under ordinary weather conditions along with other airplanes in a group, dropped their bombs far from the target. Why did this happen? When the flight was analyzed, it was discovered that the navigator, Senior Lieutenant Kochnev, had not conducted a visual orientation in the air nor had he calculated the route. At 25 to 30 kilometers before the range he busied himself by checking the instrument readings and speed rather than search for the target by light markers. When pilot Chuguyev brought the airplane to the vicinity of the range, the navigator saw a lighted marker similar to the target, took aim, and dropped his bombs while on a course about 40 to 50 degrees of the assigned one.

There is no doubt that the crew was at fault; however, one wonders where on the range was the flight director responsible for safety during the bombing and firing. The fact is that the crews were actually being directed from their home base which 50 kilometers from the range. The director at the range was deprived of the possibility of controlling the flight by radar. The commander who had radar equipment at his disposal did not warn the crew that they had deviated from their assigned course. What is more, not having heard the report "bombs away" from the airplane, he permitted the bombing to take place later than it was supposed to.

In other words, the situation was as following: one of the directors (at the range) was not able to observe the airplanes; the other, who was directing the flights from the airfield, did not maintain contact with the crews in the area of the range. Also he did not know the situation on the ground at the range.

This example, like many others, points up how important it is to locate the radio control equipment properly. Some officers in charge consider that the radar sets can be located either at a command post at the range or can be away from it. Let us examine the merits and shortcomings of these two variations.

If a radar scanning set and a fire control unit are available at the range, they are most frequently placed in the immediate vicinity of the command post. Such a system provides for the co-ordinated operation of the teams manning the sets and for the rapid transmission of the targets which have been detected from the indicator of one set to the indicator of the other.

Nevertheless, this system of locating the radio equipment also has important shortcomings. When they are located at the range command post, the personnel manning the scanning devices are

not able to control the airplanes on their combat course and near the area where the bombs will be dropped. The fire control set cannot always follow and control the airplanes so that they will remain inside safe limits.

When there is only one scanning radar set at the range, it should, on the basis of experience, be located at a distance of 18 to 20 kilometers from the area of the bombing targets. In such a case it is expected that the director would have dependable wire communications. Thus if the position is selected properly, the control will be most dependable and complete and the safety requirements will be satisfied while having considerably shorter intervals between airplanes than when using a fire direction set.

The flight director must maintain a strict check on whether or not the data which the fliers in the air are supplying corresponds to the actual distance that the airplanes are away from the range. We did have a case where a crew, while performing a bombing mission, established contact with the ground too soon. As he approached the range, the pilot gave the distance to the target. The data which the flight director, Officer Kravchenko had on his plotting board was somewhat different. This happened because the plotting board operator made the plotting arcs with reference to a different target than the one which was to be bombed.

When the airplanes are following at short intervals but are attacking different targets, it is necessary to have plotting arcs for each of them in order to determine more accurately the distance from the bombers to the targets. It is necessary, however, to make other entries on the plotting board which cause it to be overloaded. Therefore we use the following method. The operator takes a ruler which has markings and to which has been attached another freely-moving ruler. With the help of this device the operator establishes the distance from the airplane to any target and, if necessary, to the boundaries of the range, to closed areas, etc. This is done rather simply. The base of the second ruler is placed at the location of the airplane and the necessary distance is measured (the scale of both rulers is the same). If necessary, the second ruler can be removed or placed on top of the first. This makes it possible to use two rulers like one.

With this method it is possible with sufficient accuracy to determine the distance from the airplane to the targets only from a considerable distance away. As the bomber draws closer to the location of the radar set there is a situation where the difference between the angular distance and the horizontal distance from the airplane to the target becomes ever greater as the altitude at which the plane is flying is increased. Therefore, when the airplane approaches the target, it is necessary, depending on the altitude of the airplane and the location of the radar set with respect to the course of the airplane, to make a correction in

converting the angular distance to horizontal distance.

In order to provide for safety while bombing during the hours of darkness, it is vitally important to have properly equipped visual night targets. Usually it is considered that the brighter the target is the better. On the whole this is, of course, correct; however, the number of numbers should, first of all, be in strict accordance with regulations, and second, the best visibility for night targets is obtained by achieving exact conformity with respect to configuration. This will be a guarantee that the crew will not confuse the target with other markings of similar appearance.

In addition, night bombing requires a certain amount of special training. The readings of all the observing instruments should be checked with respect to the center of the target or a base point and should be adjusted accordingly. Once before a night flight Captain Aripovskiy ordered Private Pochtarev to light on a lantern at the center of target; the plotting board was to be based on this point in order to establish an appropriate scale for the readings of all the observation instruments. Pochtarev placed the lantern not by the center post but rather by one which was located nearby.

The direction of the crews which are in the air, as is known, is accomplished by radio communications. This is done through the use of FM sets. At one of our ranges we decided to handle transmissions to the airplanes on the results of the bombing by using short wave radios. This was done in order to teach the radio operator-gunners and to train the flight directors. This method of communications is, however, still not being used sufficiently.

The control of the flights at the range is a no less important and responsible matter than is the control at the airfield. One must not consider that this is only for the maintenance of safety in the air and on the ground. The strict observance of the flight plan with respect to time and any redirection can and must be accomplished without any accidents or tendencies toward them while maintaining a proper distribution of organizational radio and radar equipment. This is why the flight control at the range, as one of the most important aspects of the combat training of aviators, must receive more attention.

V. THE IMMEDIATE SUPERIOR MUST INSTRUCT THE PILOT  
(PILOT INSTRUCTION BY FLIGHT COMMANDERS)

30 June 1960

Page 2

Capt. V. Fokin, Pilot Second  
Class, Flight Commander

The role of a flight commander in training flying cadres is enormous. It is his duty to teach his subordinates the techniques of flying and the elements of combat flying and thus make capable aerial fighters out of them.

In practice, however, one encounters instances where higher commanders deprive the flight commanders of the opportunity of fulfilling their regulation duties completely. They show little concern about the growth of the flying skill and techniques of the personnel and developing in them the necessary instructor traits. It is not by accident that some of the instructors differ little from ordinary fliers.

In our opinion, the attempt of some leaders to displace the flight commanders is absolutely unjustifiable. Some squadron commanders try to do everything themselves; they conduct ground classes and training; they check the flying techniques of the pilots, etc. Also there are cases where the instructor who is training the personnel is not the direct commander. The flight commander remains on the side during this work. This practice unavoidably leads to a lowering of the quality of the combat training.

Lieutenant Tikhonov came to the flight which I command. The officer's flying book showed that he had not yet made a single flight at night. I tried to teach my new subordinate and to learn the level of his flying training. After all, I had to instruct him in flying at night under ordinary weather conditions. To my very great surprise another instructor was given the task of training Tikhonov and I was ordered to lead some pilots from another flight.

What was the result of this? Lieutenant Tikhonov actually had two instructors. I as the flight commander prepared him for his flights, checked his theoretical knowledge and conducted training in the ground trainer and in the cabin of the airplane. Capt. Krylov supervised the actions of the pilot in the air. Despite our efforts, Tikhonov made mistakes and his training dragged along. This, of course, is not surprising. The training of this pilot from the very beginning had been organized on an incorrect principle. After all, the ground training and the actual flying constitute a single training process. With us this process was disrupted artificially. I, for example, did not have a detailed knowledge of how the pilot was performing in the air while Capt. Krylov in turn did not pay attention to how Tikhonov prepared for the flight.

Of course, we exchanged observations and conclusions from time to time. But can this be a substitute for direct and continuous

observation of the actions of the pilot on the ground and in the air? The reasons for the difficulties of the officer were not uncovered quickly.

While descending for a landing Lieutenant Tikhonov did not maintain the proper method of descent. After the first flight, Capt. Krylov informed me that the pilot passed the distance approach at a height of 200 meters and then descended abruptly. In order to arrive at the near landing point at the required altitude, he had to level off the plane. After this he again had to descend abruptly. As a result, the landing was very rough.

Taking into account these remarks of the instructor, I tried to explain to the pilot the reasons for his errors and then again explained the method of descent; after this he was given special training in the ground trainer.

Nevertheless, Tikhonov made the same mistakes on the next flight. What else could I do? I could again listen to the instructor, talk with the pilot, tell him what to do, etc. Would it not be better to go up with him myself in order to observe his actions in the air?

The slowness of Tikhonov disturbed me very much. Perhaps, I thought, he would not become a good pilot. After all such things do happen!

The answer to this question was found later. It seems that Lieutenant Tikhonov did not devote proper attention to his instruments. After passing a distant radio point, he hurried to seek out the lights of the take-off and landing strip. This meant that he was not checking the altitude, therefore, he did not maintain the required descent pattern.

Of course, this could have been avoided if the direct flight commander had been training the flier. Captain Krylov is a good instructor but he did not pay sufficient attention to the pilots and did not know their individual characteristics sufficiently well. He should not, however, be blamed for this because he had to fly with a great many officers.

There are no such misunderstandings when the flight commander is personally concerned with the training of his subordinates. He has every opportunity to study each pilot deeply and from every aspect, to study their individual characteristics, and to observe them directly on the ground and in the air. By associating continuously with his subordinates, it is much easier for him to discover the real reasons for their mistakes in the techniques of piloting and then to point out the correct way of eliminating these mistakes.

One day I checked the level of training of Senior Lieutenant Bazhenov. In going down through the clouds, the pilot did not maintain the proper vertical rate of descent. I pointed out his mistake to him; however, he was not able to correct it. I had to take over

the controls myself.

After landing I asked the pilot how he controls the proper rate of vertical descent. It turned out that Bazhenov was only observing the variometer. This was the reason for the flier's difficulties. He tried to compensate for the error by moving the control stick. But the needle on the instrument did not show the change in flight conditions immediately. This is understandable. The variometer is not highly sensitive. Bazhenov did not know this. Therefore, he moved the control stick even further. When the instrument finally reacted, it turned out that the reading was again incorrect. As a result, the pilot's actions amounted to a hurried following of the needle of the variometer.

In analyzing this flight, I explained in detail to the pilot about the characteristics of the variometer and advised him to control his vertical rate of descent by observing the gyro horizon. The vertical rate of descent, as is known, corresponds to the angle of tangency. If this angle is maintained exactly, the vertical speed will be kept constant.

The timely discovery of the reason for the mistake helped the pilot to fly the airplane properly on his next flight.

Displacing the flight commander is an incorrect practice. A squadron commander alone without active help from our side cannot successfully solve the problems of combat and political training. It was not by accident that in the unit where I previously served, there were conditions which could have resulted in flying accidents and the training of young pilots dragged on for a considerable length of time.

Each flight commander must definitely train his fliers himself in flying under simple and complex weather conditions. This is a requirement of life itself. Only under such conditions can one achieve good combat training for each flier and thereby attain accident-free flying.

## VI. VISUAL RECONNAISSANCE OF SMALL TARGETS

3 July 1960

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Lt. Col. A. Krasnov

During the course of the training, the advancing units prepared to repel any counterattacks by the "enemy". The crews of Captain Sidel'nikov and Senior Lieutenant Tereshchenko were given the mission of conducting an aerial reconnaissance of a selected area. Before the flight the aviators carefully studied the air and weather conditions and prepared a plan to accomplish the mission while taking into account the features of reconnoitering small targets.

The targets were located by employing a previously planned maneuver during which the nature of the target and its location were determined by relating objects on the ground to those on the map. The reconnaissance data was transmitted immediately to the command post by radio. The commander of the ground forces received the information he needed in time in order to evaluate the situation and make a well-founded decision.

In the squadron where fliers Sidel'kov and Tereshchenko serve, daily attention is devoted to teaching the aviators the techniques of visual reconnaissance of small targets. Classes on theory precede the practical exercises. At the classes typical targets and their identifying signs are studied.

In the squadron the training of fliers who have not had experience in reconnaissance usually begins with group classroom sessions which are conducted by experienced commanders. At these classes, much attention is given to the use of visual aids -- mock-ups of typical targets, aerial photos, charts, and other teaching aids. The fliers become acquainted with the practical methods of detecting and locating actual targets located in each area which is being reconnoitered. For example, in determining the number of vehicles or other combat equipment which is moving, it is recommended that the aviators establish how many vehicles are in a given part of a column and then establish how many such segments are contained in the area or along the road which is being reconnoitered; thus, it is possible to establish the approximate total of the military equipment. The instructor illustrates his points by using aerial photos or charts of various scales and explains what the size of the target will be when viewed from various altitudes and distances.

The studying of reconnaissance targets by using aerial photos continues during the course of ground training and individual preparations. Under the guidance of the flight commanders, the aviators study not only the characteristic features of small targets but also related features which aid in their detection (the extent to which the roads are travelled on, the location of trenches and shelters for personnel, the direction of the tracks which result

from the movement of various types of equipment, etc.) or which point to the presence of camouflaged targets.

During the training much attention is devoted to developing the ability of the fliers to identify the exact location of the targets which they have discovered, i.e. to locate the targets on the map. In order to develop this ability, the officers are given photos of targets in an area for which maps are available and then they are required to locate the targets on the map in a limited period of time and to determine the most readily identifiable signs by which it will be possible to detect the given target from the air.

It was a great help to the fliers when they were driven to the tactical range where they became familiar with the targets on the ground and studied the characteristics of the military equipment and the methods of camouflaging it.

In their tactics classes, the aviators learn how to locate probable areas of deployment of enemy reserves during both offensive and defensive situations, to establish their composition and to determine how far they are from the front lines. A knowledge of the organization and combat formations of the artillery and of guided and non-guided missile units makes it possible for a flier who has discovered one or two weapons to detect the firing positions of others which he did not notice at first.

The knowledge which has been gained during the ground training phase is then strengthened by undertaking actual aerial reconnaissance missions. This includes not only missions which are normal to reconnaissance activity but also other exercises. In particular, a method is employed where small separate tasks such as determining the traffic intensity on a given section of road, detecting some small target in the area of flight, etc. are given to the fliers. On their first flights the crews usually identify objects which have not been camouflaged. Later the conditions for finding the targets are made more complex.

Experience has shown that success in finding small targets depends to a considerable degree on how well the fliers know the area which is being reconnoitered. This is understandable. A well-prepared aviator quickly orients himself with respect to the ground and he has more time, therefore, for visual reconnaissance.

If the enemy antiaircraft defense is active, the reconnaissance of small targets is complicated by the necessity of taking evasive actions and other safety measures in order to avoid the enemy air defenses. However, some aviators do not know how to approach their target undetected, how to avoid antiaircraft fire and how to observe for enemy airplanes.

In teaching fliers tactics, it is important that the reconnaissance flights be conducted under conditions which most closely approximate a combat situation. Each exercise, therefore, should

be worked out in accordance with a tactical situation including the location of the "front lines", possible enemy antiaircraft defenses, etc. The size of the targets, their location and the conditions under which they are to be recognized should not differ appreciably from actual combat conditions. For this purpose it is possible to use aviation and artillery ranges and also the troops at the various reconnaissance targets which are covered by antiaircraft defense means can participate and receive training.

In the process of the preliminary and pre-flight preparations, the squadron commander and the flight commanders must carefully study with the fliers the best tactics for the reconnaissance, the maneuvers which can be used in defense against enemy fighters and the tactical and technical information concerning enemy anti-aircraft defenses along the reconnaissance route. During the training the tactical situation must be instructive and it must be determined to what extent the trainees have fully understood their actions during each stage of the training. It is necessary that all the aviators know how to apply themselves during reconnaissance and that they maneuver with precision during aerial combat, especially when the crew members find themselves at a tactical disadvantage with respect to the enemy.

In teaching fliers the techniques of reconnaissance, special importance is attached to a detailed analysis of the actions of the aviators in the air; this is possible only when there is a good check on the results of each flight. Before the crews take off for their reconnaissance of an area, an experienced officer goes out to the area in order to be present on the ground. From this point he observes the actions of the fliers and reports his observations to the commander. In addition, the squadron also has a practice of sending along control flights with pairs of trainers but does not ordinarily inform the fliers of this before take-off. The control personnel follow along the same route but remain in a place where it is most convenient for them to observe the actions of the crews.

To fulfill reconnaissance missions involving small targets the aviators must be highly skilled in the techniques of flying under various weather and air conditions and must have high tactical ability. The commanders must, therefore, be constantly concerned about perfecting the flying skill of our military fliers and give them solid training in how to perform in modern combat.

## VII. MEDICAL CHECKS AT THE AIRFIELD

6 July 1960  
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Captain of the Medical Service V. Motov

Now when flights are being conducted at high altitudes, high speeds and over long ranges, the health of the fliers becomes especially important. Under such conditions, even the slightest disruption of the regime of rest, eating, and work by the flying personnel can lower their ability to work and can affect the outcome of a mission.

Officers of the medical service must follow the health of the aviators daily, notice in time the slightest change or deviation from normal, and take the necessary preventative measures.

Until recently we had employed the so-called two-step system of pre-flight checks. This involves having all the fliers examined on the eve before their flights. Prior to taking off only a questioning is conducted. The facts indicate what such a system has led to.

Sometime on the day before flying, all the aviators were examined. At the parking positions the doctor conducted an external medical check of the flying personnel. The fliers looked cheerful and full of life; they had no complaints. The medical man concluded that the fliers were all healthy. He reported this fact to the commander. The crews were released to perform their combat training mission. In the first flight Senior Lieutenant Kuznetsov felt chilled and piloted his plane with difficulty. After landing he had his temperature measured and it turned out to be elevated. After a more careful check of the pilot, the doctor established that the officer had fallen ill with the flu.

Thus the doctor actually overlooked the incipient stage of the illness in Senior Lieutenant Kuznetsov. The mistake which the medical man committed could have been the reason for a flying accident.

Unfortunately, we still experience such cases. This incident served as a prod to re-examine the existing system of medical checks for flying personnel. Officers Kobakhidze and Novikov proposed that the pre-flight examination of the officers be conducted on the day of the flight at the parking position. For this purpose, portable medical apparatus were prepared through the efforts of the men. The unit commander met the doctors half way and set aside a special room for these purposes.

Thus, at the airport, in one of the rooms at the starting command post, there appeared a unique medical laboratory. In it was various portable equipment including an oscillograph, a Vishnevskiy-Kravkov chamber, an electro-cardiograph, a KP-T training oxygen

device, a spirometer, scales, etc. The well furnished Linkrusta covered walls, the carnets, and the clean curtains on the windows give the room a smart and comfortable appearance.

The medical point is so situated that it is possible to observe the movement of the airplanes along the taxi-way and take-off and landing strip and also to listen to the commands which are given by the flight director to the crews on the ground and in the air; in other words, it is possible to be continuously abreast of the events which are taking place at the air field.

Let us now briefly examine the medical check which has been introduced in our unit and let us show how it has been organized and conducted in practice.

On the eve of the flights, during the preliminary preparations, the unit doctor carefully studies the planning chart to include the sequence of take-offs and landings, the nature and extent of the flying missions and the conditions under which the aviators will be operating. Here he checks with the commander on how best to organize the checks of the flight personnel during the pre-flight period; he establishes the sequence by which the crews will appear at the medical point. Then he informs the fliers of the medical inspection plan.

Then on the next day work begins early in the morning at the medical point. The officers appear, without any protraction or delay, exactly at the established time. With the help of special medical apparatus, the doctor conducts a clinical and physiological test of the organism of the fliers. The scope of the inspection varies depending on the state of health of the given crew member and the nature of the flight mission. The doctor pays special attention to those aviators who have previously shown some deviation from normal. This precise data is supplemented by a detailed questioning and an external examination of the fliers.

At first glance it might seem that such a medical check might require much time and might to some degree distract the flying personnel from their pre-flight preparations.

This is by no means the case. In the first place, this is not true because everything is done according to a plan; second, the medical point is located close to the parking positions so that the aviators spend only a few minutes going to and from the point; third, the officers of the medical service, having all the necessary instruments in their laboratory, are able to examine one person, as a rule, in 3 to 4 minutes.

During the pre-flight preparation period, the medical worker is able to establish how all the aviators are feeling, is able to evaluate the data which he has obtained and is able to report to the commander on the spot concerning the state of health of the crews and of their readiness to perform the planned missions.

We do not, however, limit the medical check to just the

pre-flight period but rather conduct it continuously throughout the entire flying day.

The aviation doctor has a duplicate of the planning chart. He is well aware of which of the officers is landing at a given time. Under quiet conditions, the doctor is able to talk with the fliers without any pressure; he examines all questions which interest him. If he has any doubt as to how a given officer is feeling, he reports to the commander about this and adopts the appropriate preventative measures.

This system of medical checks which has been introduced in our unit helps us to detect individuals with incipient forms of illnesses and thus to prevent in time those circumstances which result in flying accidents and which result from a worsening of the state of health of the aviators. Our experience has shown that medical checks which are conducted on the day of flight using special instruments are very essential to an accurate testing of the organism of the fliers.

## VIII. PILOT ACTIONS IN EMERGENCY SITUATIONS

8 July 1960

Page 2

Colonel V. Kirpichenko

An article by Major A. Sidorov entitled "An Airplane in an Emergency Situation. How Should the Pilot Act?" was discussed on the pages of the newspaper Sovetskaya Aviatsiya. Unfortunately, there were not enough good comments by experienced commanders on this very important question.

Which of the officers is correct?

Major Sidorov asserts that an interceptor pilot can and must orient himself in accordance with the spatial position of the airplane with respect to an artificial image of the target -- "bird" --- on the reflector of the sight. Lieutenant Colonel Kardopol'tsev categorically denies such a possibility. We cannot presume that Officer Kardopol'tsev has no understanding of the principles of operation of the unit. Which of them is correct?

The question is very pertinent; let us examine it in greater detail. The actions of the pilot when intercepting a target can be divided into two phases. During the first stage -- the observation stage -- the piloting of the airplane is accomplished with the EAG together with other piloting and navigational instruments; however, (and this is very important) the flier must divide his attention in strict sequence from the EAG to the variometer to the AGI /fighter airplane gyro horizon/, from the EAG to the variometer to the speed, from the EAG to the variometer to the DGMK, from the EAG to the variometer to the altimeter, from the EAG to the variometer to the instruments for controlling the operation of the engine, etc. In order to assume the initial position, it is sometimes necessary to perform a maneuver with considerable yawing and changes in vertical speed. This is fully permissible when one is watching his instruments according to the above mentioned sequence.

During the second stage -- the attack -- the flier must concentrate his attention on the reflector of the sight (to combine the central point of the grid of the site with the center of oscillation of the artificial image of the target) and also to determine the range and the speed of closure. He must also make the appropriate corrections depending on the speed of displacement of the mark of the target with respect to the airplane and for the determination of the range for opening and ceasing fire and for breaking off the attack.

The last stage is very complex and entails a number of difficulties especially for the flier who has not mastered the seemingly simple principle of operation of the "bird".

As is known, the position of the "bird" on the reflector of

the sight corresponds to the angular position of the target with respect to the longitudinal axis of the airplane. Let us suppose that the central point of the sight is matched with the center of oscillation of the "bird" and the pilot notes the position of the airplane on the aerial horizon without any yawing in horizontal flight, i.e. the target retains a rigid position with respect to the course of the interceptor. Let us suppose, however, that the "bird" begins to displace to the right. What does this mean? Such an incident could arise because a target began to move to the right or because the airplane has inclined to the left because of such a yaw. How should one act?

Regardless of why the "bird" began to move to the right, the pilot must immediately incline to the right and shift the central mark by 10 to 15 thousandths ahead of the "bird"; otherwise, if the target moves to the right, a miss could result. If the airplane inclines to the left as a result of some yawing, the pilot corrects for this yaw by inclining the plane to the right.

Consequently, the pilot can establish the angular displacement of any target with respect to his plane or with the plane with respect to the target (this however, is not so important to the pilot) by the movement of the "bird". It is important to remember that any angular displacement is related to a yawing of the airplane or the target and that in the latter case the interceptor must make the same maneuver in order to accomplish a successful attack.

A similar matter is the action of the pilot where there is movement of the "bird" in a vertical or combined plane. Thus, by the movement of the "bird", it is possible to establish the position of the airplane with respect to the target.

#### How to devote one's attention to the instruments.

The target, as a rule, will not maneuver with smooth movements or with low vertical and closing speeds in order to create favorable conditions for the attacking plane. This, it is evident, is not fully understood by Lieutenant Colonel Kardopol'tsev who recommends a clearly unacceptable system for devoting one's attention to the instruments; he bases his ideas on a single argument -- the necessity at all times of controlling the spatial position of the airplane. How can one establish the spatial position of the airplane during the second phase while attacking and how important is this to the pilot?

In order to answer such a question, it is necessary to analyze and have a clear understanding of the actual possibility for the pilot to accomplish this complex series of actions. As is known, these actions are related to the specific characteristics of establishing spatial orientation while flying by instruments and checking the readings of the instruments in very short periods of time. Is this possible?

Actually, can the pilot devote his attention to such a special system while attacking a target, aiming, and opening fire while not flying by instruments? The answer is no. Can he know the readings of the instruments which show the operation of the engine, any yawing, and the angle of ascent or descent if his attention is fully concentrated on the reflector of the sight and on making the appropriate corrections depending on the actions of the airplane which he is attacking and on the concrete conditions of the situation in the air.

I could reply that the pilot by no means must look in a cabin while flying without instruments because his field of vision includes the horizon, the sky, and the earth and he always has the opportunity of periodically checking the spatial position of his airplane. This is absolutely correct because in non-instrument flying it is much easier to make an attack.

In attacking a target, as was stated above, the pilot copies the actions of the plane which he is attacking by following the "bird"; however, as soon as it is possible he makes periodic checks with respect to the horizon.

Thus the interceptor pilot in the automatic system checks the spatial position of the airplane from time to time only by the AGI. The most important thing at a given moment is to observe the movement of the "bird" and to move the rudder accordingly. The distance to the target is determined by the appearance of vertical marks on the wings of the "bird"; with respect to their time of appearance, the speed of closure is established. Another factor is determining the distance at which to open and cease fire and to discontinue the attack. A check on the spatial position of the airplane at a given stage is obtained by observing the artificial image of the target. Therefore, the recommendation of Lieutenant Colonel Kardopol'tsev to use a different system of watching the instruments is unacceptable.

#### Knowledge, ability and skills.

In order to fly confidently under complex weather conditions, the flier must know the instruments and equipment of the airplane and the ground radio equipment used in connection with the flight, their principle of operation, and also the rules for apportioning one's intention, how to handle the controls, and a number of other matters. However, in addition to knowledge, there must also be the ability which one acquires by performing certain exercises. If, for example, a pilot has studied everything listed above but has not been trained in employing his knowledge in practice (on special apparatus or training planes), regardless of how sure his knowledge is, he will not be able to employ it during flight.

An insufficiently trained aviator, as a rule, makes mistakes because he must recall each time the necessary positions and think about how they are to be performed. Therefore, the profession of

being a flier requires very frequent repetition of first the simple and then the more complex actions. Experience shows that even well-trained officers lose their skill in flying airplanes if their flying has been interrupted for long periods; in order to restore their skill, they must be given preliminary training on special apparatus and in a combat trainer.

Without knowing these facts or if one ignores them, it is impossible to judge correctly the reasons for the loss of spatial orientation or for a plane to become involved in an emergency situation nor is it possible to systematize and make an analysis of the factors which lead to flying accidents and errors in flying technique; therefore, it is not possible to construct the entire process of training pilots.

Why false sensations appear.

In the article of Lieutenant Colonel Kardopol'tsev entitled "Bird' and Instruments" the following example is given. An experienced officer who has good technique discovered while flying a night reconnaissance mission that he felt as though he was flying upside down and he could not rid himself of this sensation as long as he was flying in the clouds. It is clear, that in this case the pilot was in a very serious situation because of an illusory sensation. This sensation developed because there was a disruption of the balance between certain external factors -- light, sound, passage -- on one hand and certain internal processes such as the reaction of the various systems of the organism -- vision, muscles, vibrational sensations and other feelings -- on the other hand.

All kinds of false sensations are produced while flying in complex weather conditions. They are produced by changes in the flying routine as a result of the influence on the airplane of aerodynamic forces which operate in various directions and also changes in the speed and in the magnitude of the load. There are visual illusions when flying through layers of clouds which do not have a horizontal orientation. Other factors are insufficient rest before flying, exhaustion, illness, drinking alcoholic beverages, excessive smoking, etc. Still other factors are the lack of confidence of the flier in his ability and the influence on the airplane of complex weather phenomena (bumps, downdrafts and updrafts, etc.). These are the basic factors.

It should be kept in mind that false sensations can be of short or long duration. Everything depends on the effect of the above listed factors on the pilot. Thus, one of the reasons for a prolonged loss of spatial orientation can be the absence in the pilot of sufficient flying skill under complex weather conditions. An inexperienced flier, as a rule, does not trust his instruments and involuntarily places the airplane in a serious situation which could lead to undesirable consequences. On the other hand, the experienced pilot overcomes these false sensations because he has

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faith in his instruments and therefore continues to fly his plane thus avoiding the occurrence of a serious situation.

To find the reason for a mistake.

It is necessary to return to the example given in the article by Major A. Sidorov. Pilot Bulatsan, before leaving his formation, began hurriedly to prepare for what was going to happen, lost his spatial orientation and, not having sufficient experience in determining the position of the airplane according to the instruments, was able to bring the airplane into horizontal flight only after coming out from under the clouds. Lieutenant Colonel Kardopol'tsev and Lieutenant Colonel Fedotov look on this pilot error as being a lack of discipline.

Would Pilot Bulatsan, who for the first time was performing a new exercise, intentionally want to fail the mission. The reason must be sought in the method of teaching the flier, i.e. in the errors of the commanders themselves who apparently were poorly acquainted with the individual characteristics of this subordinate and who were not able to teach him the correct actions.

What conclusions can be drawn from these examples? In the first place the pilot lost his spatial orientation because he felt poorly (he did not rest and was nervous before the flight); however, a serious situation was not created. Regardless of the illusion which he had, he had complete faith in his instruments and continued to fly the aircraft until he emerged from the clouds. What caused this favorable result? First of all, it was firmly ingrained skills, self control and restraint. In the second case, the serious situation resulted from external reasons. In this case the flier did not lose his spatial orientation and had a clear picture of the position of the airplane and brought the airplane into horizontal flight as soon as possible. The third example is a case where an insufficiently experienced pilot himself put the airplane in a serious situation.

It is a very difficult matter for an inexperienced aviator to bring an airplane out of an emergency situation. The authors of the articles which were published gave concrete examples of how a flier must act in a complex situation. The recommendation of Major A. Sidorov is especially valuable. He recommends that the control stick be inclined in the direction of the brown light, etc. in order to bring the airplane out of such a situation.

In order to act with confidence while flying, the aviator must be given systematic training in special apparatus and in combat trainers. Without sufficiently ingrained skills or if they have been lost, it is not possible to orient oneself quickly and to establish one's spatial position by the piloting and navigational instruments.

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Truth, they say is born in arguments. The discussion on the pages of this newspaper of the article "An Airplane in an Emergency Situation. How Should the Pilot Act?" will doubtlessly be of some value to aviation commanders in teaching their flying personnel this very important element of the technique of flying.

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## IX. PREVENT OXYGEN FAILURE (MAINTENANCE OF OXYGEN EQUIPMENT)

14 July 1960

Page 3

Engineer Lt. Col. V. Bershov

During flight, Senior Lieutenant Tamazyan suddenly felt that his breathing had become labored. Casting an anxious glance at his instruments, the pilot saw that the oxygen pressure in the on-board system had fallen to zero. There was no time to think of the reason for this. Tamazyan quickly switched on the supply from the parachute device and with the permission of the flight director discontinued his mission.

On the ground an engineer established that Officer Tamazyan, in checking his oxygen device before flight, had forgotten to close the emergency supply valve and as a result the oxygen had leaked.

After this incident, all flying personnel were required to pay greater attention to their preparations for high altitude flight. The valve no longer can remain open. For this purpose marks were made on the valve knob and on the panel so that they would form a single broad white band when the knob was in the closed position. At the same time specialists replaced the knobs with a folding handle so that in the closed position it folds inside the cabin.

In practice it was noticed that the reducer valve would stick to its seating when closed too tightly. In order to avoid this, an indicator is used to see that the valve is closed properly rather than to have this done by hand. This is done as follows. A specialist opens the emergency reducer valve and by evenly turning the knob in a clockwise direction lowers the pressure. As soon as it equals zero, the parts of the indicator merge; this means that the valve is closed.

Our specialists do everything possible in order to provide for the successful accomplishment of high altitude flights. Much, however, depends on the flying personnel. In accordance with the accepted system, the pilot, navigator and aerial gunner are responsible first of all for their oxygen equipment. They bear material responsibility for it. They naturally are better aware of the weak points which require daily checks. The dependability of the equipment in the air is related to how well the flying personnel care for the equipment on the ground and how well they protect it between flights.

Somewhat while flying a fighter aircraft, flight commander Captain Larionov began to feel that the oxygen was being supplied to his mask in an inadequate quantity. Soon the pilot had to switch on his emergency supply. What happened? It seems that the malfunction developed through the fault of Larionov himself. When he returned from his previous flight, he, while getting out of the

cockpit with his parachute on, failed to disconnect the hose and tore it. While getting ready for his next flight, the officer did not notice this defect and as a result he found himself in a difficult position in the air.

Another pilot, Senior Lieutenant Skidan, did not connect the hose of the parachute oxygen device to the on-board system before take-off. During the course of the entire flight he breathed cabin air without once glancing at the oxygen indicator. Everything turned out satisfactorily only because the flight was conducted at a relatively low altitude.

These incidents could not help but arouse the leadership personnel of the unit. The mistakes of the fliers became the subject of a major discussion at a post-flight meeting. The engineer gave instructions for each technician to assist the fliers who were wearing parachutes in taking their places in the cabins and to check the position of the hoses and their proper connection to the armature. Our specialists began to mark the oxygen equipment. Uniform, legible and indelible markings with the last name and initials of the user and the number of the unit were made on the parachute oxygen devices, masks and carrying cases. This increased the personal responsibility of the flying personnel for their property.

In order for the commanders, engineers and doctors to be able at any time to check the condition of the oxygen equipment, it was kept in cupboards designated for each unit. Unfortunately, the fliers sometimes leave foreign objects in the canvas carrying cases along with their masks; this causes deformation of the masks or broken pieces. Outer garments can also be kept temporarily in the cupboards along with the high altitude suits.

After each flight, it is necessary to dry the oxygen mask and the high altitude protective suit thoroughly. High humidity causes especially rapid wear to the casings including the communications lines (chambers) of the tension device of the high altitude suits.

Until quite recently, a number of our fliers such as Officer Neklesov did not use the front fastening of their gas masks saying that it interfered with vision. Now they have come to the conclusion that this fastening must be used in order for the mask to fit properly.

If the mask has been properly selected and the on-board apparatus has been carefully checked, the crew will have a dependable supply of oxygen. When the rules for using oxygen equipment are strictly observed, the equipment works without fail.